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The Rime of the Ancient Mariner: Coleridge's Scientific and Philosophic Insights

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I

IF a book entitled *Coleridge the Scientist* appears in the near future, the reason will not only be that many other categories of the thinking of a man who literally "took all knowledge for his province" (Read, p. 96) have proved worthy of full-length studies.[1] The reason will also be that relatively recent scholarship has returned with increasing interest to his scientific or quasi-scientific pronouncements[2] in a surprisingly comprehensive range of disciplines (see Barfield, p. 37; Ball, p. 20; and Read, p. 97). Coleridge often devoted extensive labor to intellectual problems with bases in the natural sciences. Among the most prominent products of Coleridge's labors are, of course, his aesthetic dicta stemming from the biological concept of organic form, such as the "coadunating" power of the imagination" (Watters, p. 93). But he also did work in physics (Abrams, 1972), meteorology (Mann), astronomy (Lowes), chemistry (Coburn), and medicine (Harris). This does not mean that Coleridge's efforts lacked direction or coherence. His scientific work is one aspect of his philosophical thinking. He intended his philosophy to be comprehensive and so he did not partition scientific insights and philosophic insights into sepa-

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rate categories. Rather, he attempted "to give a philosophical basis to science" (Miller, p. 86).

Part of what has delayed a full-length study of Coleridge's science, I suspect, is a prevalent opinion that "To most modern readers, Coleridge's writings on science appear as incomprehensible nonsense, pure gibberish" (Miller, p. 77). Even "against the knowledge of his age" Coleridge is not always given high marks. Boulger, for instance, thinks that Coleridge's "approach to science . . . often approaches the ludicrous . . . [his approach] appears trivial or irresponsible in [its] desire to move from primitive knowledge to grand ontological view" (p. 312). But this assessment is certainly not unanimous. Critics of the stature of Abrams, Ball, and Barfield consider Coleridge's scientific jottings anything but "nonsense":

> Once we recognize the elements of scientific curiosity in so many of the descriptive entries in the Notebooks, we begin to modify the idea that Coleridge might be just an accurate observer of the world, one brilliantly capturing the miscellany as it comes. . . . he would be unfaithful to his philosophic self were it otherwise, and false too to his concept of what constitutes a genuine scientific interest in phenomena. . . . Hence it is not surprising to find a strong current of intellectual speculation coursing through the Notebooks, giving many entries the status of experiments, not merely descriptions. [Ball, p. 28]

In fact, it is quite possible to see Coleridge's scientific assumptions in a favorable light, especially if we do not unfairly pit him against the standards and discoveries of science in our own time. As Snyder (1924) suggests, Coleridge's cosmogony is, in historical context, forward-looking. Potter is even more enthusiastic, crediting Coleridge with sensing "the significant currents of thought in the civilized world," even though Coleridge's perceptions were sometimes more instinctive than conscious (p. 379). My own sympathies lie with Potter. I can find nothing in Coleridge, aside from portions of the letters and occasional notebook jottings (none pertaining to science) to justify such strong epithets as "ludicrous" and "trivial." Certainly nothing in the works consciously intended for publication merits such a valuation.

II

Another of the traditional reasons for looking askance at Coleridge's scientific writings has been an unresolved dispute

about whether he plagiarized at least some of them. By far the preponderance of opinion on the part of those who have made in-depth studies of Coleridge's interactions with other thinkers is that he did not appropriate materials unchanged. When he translated or adapted passages, he often embellished or extended the ideas and even disagreed with the conclusions reached by the person whose material he was utilizing.[3]

But what of Coleridge's scientific thought, in particular? Beach's challenges to Coleridge's originality may disincline us to accept, on behalf of Coleridge's scientific writings, at least, the traditional defenses for his compositional procedure. Here, however, it seems to me that Snyder's judgment has not been superseded:

> The annotations as a whole evince a critical attitude toward the material presented, an attitude not compatible with any merely fanciful playing with cosmic theories or cosmic images. Even those that are somewhat facetious in tone show Coleridge's philosophic imagination hard at work, ever challenging and then accepting or rejecting as the case may be. [1924, p. 621]

Sankey (p. 67) favorably compares Coleridge to Darwin in this regard:

> Both Coleridge and Darwin devoted themselves to the interpretation of nature. Neither man had the habit of simply responding to the scenery, taking pleasure in the emotions aroused by natural surroundings; they were too busy attempting to understand what they saw. It might even be argued that Darwin's scientific work was a successful application of Coleridge's methodological program: the illuminating insight, applied to a variety of formerly unrelated fields, and supported by a careful review of all relevant experience.

Whatever picture might exist of Coleridge as a copyist who had not the training or the talent even to assimilate, much less originate, scientific hypotheses simply must be repainted. Beach's apparently devastating proof of the pilfering of the *Theory of Life* from Schelling and Steffans does not shake this judgment. Even McFarland (no fan of Coleridge's science) finds, if Abrams's discoveries about the dominance of Coleridge's "metaphysical consciousness" are taken into account, "this strange and borrowed work curiously Coleridgean" (p. 325). Overall, the most sensible judgment about the charge of "literary buccaneering," a judgment which Hume (p. 489) and McFarland accept, is that the "source of Coleridge's mature thought is his own earlier ideas. As Potter says (p. 395), "It is not

as an originator but as a reflector—a many-faceted reflector—that Coleridge is important." Coleridge is dramatically original in perceiving a mediating function for the powers of the mind; his empirically-based, philosophic analysis of consciousness, for instance, is a significant contribution to the "dialect of the imagination" (Freedman, p. 217; Metzger, p. 783).

III

Although the preponderance of Coleridge's scientific musings are found in his prose,[4] reflections of science are also evident in his poetry. Coleridge, ". . . more than any other creative writer of his time sought some reconciliation between science and literature" (Evans, p. 44), and Coleridge felt that the poet and the scientist worked in similar ways.[5] Coleridge saw the poet's need for symbiosis of idea and instance, a reciprocity of concreteness and transcendence, as virtually identical with the scientists', the only difference being the order (of chronology, not priority) in which the two elements are used: ". . . where Coleridge calls the process of the scientists 'meditative oberservation,' he calls the creative power of the poet 'observant meditation'" (di Pasquale, p. 495). As Miller remarks, ". . . in nearly all his works Coleridge utilizes for illustrative purposes concepts and imagery drawn from the sciences. He applies the concept of cyclical imagery to an atom, a magnet, a poem, a state, and the Trinity, maintaining a remarkable consistency of imagery throughout" (p. 78). In his literary criticism, Coleridge adopts the conceptual framework and the terminology of natural science:

> Hence the strong hold which in all ages chemistry has had on the imagination. If in SHAKESPEARE we find nature idealized into poetry, through the creative power of a profound yet observant meditation, so through the meditative observation of a DAVY, a WOOLLASTON, or a HATCHETT . . . we find poetry, as it were, substantiated and realized in nature. [*The Friend,* 1:471][6]

Convergence of scientific and literary principle in Coleridge occurs most prominently in the concept of organic unity,[7] a concept which has important implications for *The Rime of the Ancient Mariner.* It is crucial to keep in mind that, although in our own time "organic unity" has been applied to justify the connection in one work of any elements otherwise inexplicable, for Coleridge the term had a precise and useful meaning. It

was a recognition that (1) the components of an integer are both parts and whole, totally interpenetrated in each other yet remaining discrete; (2) the form originates internally, rather than being dictated by prefabricated rules; and (3) each work develops in its own way and must be approached by the reader in that way, not with the model of some other work in mind. Now this allows for unlimited flexibility and expansibility, since each newly-created entity can develop its own individual structure, but it must at the same time maintain precise, definable, and defensible internal patterns as well as relationships to all other entities.

Both the strictness of Coleridge's formulation of his theory of organic unity and its applicability to a literary work emerge quite clearly if we turn our attention to his Shakespearean criticism, long recognized as the meeting ground of philosophical principles and literary constructs for Coleridge:

> Shakespeare shaped his characters out of the nature within; but we cannot so safely say, out of *his own* nature, as an *individual person.* No! This latter is itself but a *natura naturata,* an effect, a product, not a *power.* It was Shakespeare's prerogative to have the *universal* which is potentially in each *particular,* opened out to him in the *homo generalis,* not as an abstraction of observation from a variety of men, but as the substance capable of endless modifications, of which his own personal existence was but one, and to use *this one* as the eye that beheld the other, and as the tongue that could convey the discovery. [*Miscellaneous Criticism,* pp. 43–44]

Here the notion of the one-in-many and the many-in-one is a criterion for literary excellence, not only because there is a "happy balance of the generic with the individual" (*Biographia Literaria,* 2 : 187), but also because more profoundly, ". . . here is an example of the reconciliation of opposites which the imagination embodies. The character is neither an individual nor a class alone, but, as it were, 'a class individualized' " (Badawi, p. 104). As Coleridge's remarks about character motivation, imagery, and the need for good actors in all roles, not just the major ones, make clear (Badawi, pp. 92, 114, 162, 163), he is espousing the symbiosis of individual and class, one and many, not merely bringing them together as contraries offsetting each other, or existing in a relationship of immovable object and irresistible force.

IV

That Coleridge was able to apply scientific hypotheses to literary criticism is a circumstance that might lead us to wonder

whether he ever extended the applications of the science with which he was acquainted, and used these hypotheses in the *writing* of literary works, such as *The Rime of the Ancient Mariner.* Although I think that such may have been the case, the possibility that he did so is only a possibility. My present contention is that scientific thought enables us to understand the structural (and perhaps thematic as well) workings of at least one Coleridge poem, *The Rime of the Ancient Mariner,* more clearly. I do not ascribe to Coleridge any conscious intent to apply scientific method, though what may have, as Lowes would have it, bubbled up from the well of the unconscious, is a metaphoric forerunner of modern quantum and field theory,[8] based on Coleridge's own convictions about organic unity operative both ontologically and epistemologically.

This scientific outlook especially yields dividends in explaining one of the most puzzling features of *The Rime of the Ancient Mariner*—the prose gloss. Until very recently, this prose gloss was explained in terms of Coleridge's tendency to append marginalia, notes, and prefaces to his poems (Martin, p. 71). At times Coleridge could become almost humorously frenetic where such addenda were concerned: " 'The Motto—! —Where is the Motto—? I would not have lost the motto for a kingdom twas the best part of the Ode' " (Stephens, p. 402). Although it is frequently justifiable to regard this apparatus as trivial, pedantic, or purely exculpatory (Schulz, 1961, pp. 53–54), we must not be misled into the error of thinking, as many of Coleridge's contemporaries did, that this is true of *The Rime of the Ancient Mariner* (Stevenson, p. 31). As recently as 1969, Dunn assumed that "It was precisely to compensate for the lack of 'artful transitions' and 'full and extended connection of parts' that the gloss was added in 1815–1816." The temptation not to distinguish the "editorial" paraphernalia of *The Rime of the Ancient Mariner* from similar productions elsewhere in his works is made greater by the temporal coincidence of Coleridge's addiction to penning marginalia and his revisions of *The Rime of the Ancient Mariner.*[9]

Dyck's view of the gloss as narrative device by which two versions of the same story (the mariner's and the glosser's) may be compared is a major step in what I consider the right direction, though I think in one important respect she too misses the mark.[10] Comparing the narrative stance of the poem to Browning's *The Ring and the Book,* she views the tale as having a telling

and a retelling. This is not true, precisely, for *The Rime of the Ancient Mariner,* since the glosser's tale is simultaneous with, not sequent to, the mariner's version. It is this major difference that I think works against not only this comparison but also others which on the surface might be similarly attractive. One thinks immediately of *The Moonstone,* in which each of the narrators supplies a portion of the story, no one by himself being in possession of all the facts; or of *The Grapes of Wrath,* its dichotomous structure of narrative and intercalary chapters seeming to parallel the ballad and the gloss, respectively, of *The Rime of the Ancient Mariner.*[11]

In applying the findings of quantum theoreticians to *The Rime of the Ancient Mariner,* even as loosely as an illustrative purpose permits, we are conscious of utilizing discoveries from the microworld of subatomic physics in the larger world of the mariner. This, of course, represents no handicap for modern theoreticians, since it is assumed that the laws of nature are constant; it is only because particles in the macroworld are so massive compared to atoms that the classical (i.e., Newtonian) physics can account adequately for observed behavior (Schlegel, pp. 222–23; Baker, pp. 190–91). Though Coleridge, naturally, had no way of foreseeing the revolutionary developments of subatomic physics, it is interesting that he did recognize a difference in manifestation of macro- and microreality:

> Thus the finite and infinite are the two necessary forms of Being, Manifested—which can never be divided—the instances in which either is assumed singly, will be found mere abstractions; or else those forms of subjective imagination, such as an atom, or Infinite Space. And what is Space? a something with the attributes of Nothing! but in real Science we must say
>
> 1. Being
>   or identity of Finite and Infinite
> 2. The Finite in the Infinite — [12]
>
> This is the proper answer to the argument in these pages. Finite & infinite are not contrary things but opposite correlative forms [Terms?] of the same Reality—just as Attraction and Repulsion are the antagonist *forces* of one & the same *Power.* [Kurtz, p. 211]

That the poet's coalescent vision could (in fact must) employ the observations of one realm to probe the other imaginatively—in a recognition that the laws of aesthetics, like those of other aspects of nature, are also constants with differing

manifestations—is deducible from Coleridge's poetic statement as early as 1800. Whether Coleridge had all this so systematically asserted when he actually composed *The Rime of the Ancient Mariner* and when he made the major revisions we know from two letters written less than a month before he started composition of the 1798 version of the poem:

> —I can *at times* feel strongly the beauties, you describe, in themselves, & for themselves—but more frequently *all things* appear little—all the knowledge, that can be acquired, child's play—the universe itself—what but an immense heap of *little* things? I can contemplate nothing but parts, & parts are all *little*—!—My mind feels as if it ached to behold & know something *great*—something *one & indivisible*—and it is only in the faith of this that rocks or waterfalls, mountains or caverns give me the sense of sublimity or majesty!—But in this faith *all things* counterfeit infinity!— [*Collected Letters*, 1:349]

> For from my early reading of Faery Tales, & Genii &c &c—my mind has been habituated *to the Vast*—& I never regarded *my senses* in any way as the criteria of my belief. I regulated all my creeds by my conceptions not by my *sight*—even at that age. Should children be permitted to read Romances, & Relations of Giants & Magicians & Genii?—I know all that has been said against it; but I have formed my faith in the affirmative.—I know no other way of giving the mind a love of 'the Great', & 'the Whole'.—Those who have been led to the same truths step by step thro' the constant testimony of their senses, seem to me to want a sense which I possess—They contemplate nothing but *parts*—and all *parts* are necessarily little—and the Universe to them is but a mass of *little things*. [*Collected Letters*, 1:354]

This latter excerpt, juxtaposing as it does comments about works of the literary imagination with the questions of the relations of parts to whole and small to large, shows Coleridge considering the same issues that, if my reading of *The Rime of the Ancient Mariner* is correct, are given play there. The cosmological problem of size was very much in his mind, then, and we can be sure, on the basis of internal evidence alone, that other scientific data in the poem were carefully grounded in comprehensive reading and thoughtful infusion of fact in creative process (see Lowes, passim, and Jeffrey, p. 3).

Coleridge also believed that an objective, physical cosmos could not exist as a dead mechanism of matter, independent of the observing mind. That the act of measurement or observation could influence the entity observed Coleridge remarked in his notes on John Smith:

> Thus Cudworth, Dr. Jackson . . . Henry More, this John Smith, and some others. . . . What they all wanted was a pre-inquisition into the mind, as part organ, part constituent, of all knowledge, an examination of the scales, weights, and measures themselves abstracted from the objects to be weighed or measured by them. . . . [Shedd, 5:266–67]

This belief coincides with one of the implications of quantum theory: "a genuine ontological dependence which does indeed force the scientist-observer in some measure to be responsible for the particular micro-events which he describes" (Schlegel, p. 218). If quantum theory is correct, "The spectator of an objective, unchanging natural world would have become an impossible myth, replaced by the participant scientist whose measurement procedures and state of motion contribute to the intrinsic properties of what he observes" (Schlegel, p. 226). Coleridge realized that many different states of matter exist simultaneously. Which state strikes the observer as "reality" at any given moment depends upon the mind set of the observer:

> How opposite to nature & fact to talk of the one *moment* of Hume; of our whole being an aggregate of successive single sensations. Who ever *felt* a *single* sensation? Is not every one at the same moment conscious that there co-exist a thousand others in a darker shade, or less light; even as when I fix my attention on a white House on a grey bare Hill or rather long ridge that runs out of sight each way. . . . [*Notebooks*, 2:2370]

Analogously, in quantum theory, ". . . the micro-particle generally is in a superposition of different states before observation brings it into some one velocity state. . . . And, it is in the possibility of physical systems existing in a superposition of different states, for a given observer and at one and the same time, that quantum theory breaks irrevocably with classical physics" (Schlegel, pp. 220–21). Coleridge's rebellion against seeing fixed and rigid particles of matter as reality permitted him to move in the direction of a physics of energy states:[13]

> . . . in radical opposition to the picture of a world composed of particles of matter in motion, to whose impact an alien mind is passively receptive, Coleridge sets up what, following Schelling, he calls a 'vital,' or 'dynamic,' or 'constructive' philosophy. The elements of this philosophy are not moving material particles but inherent energies, or 'powers,' that polarize into positive and negative 'forces' (often called 'thesis and antithesis') which operate according to 'the universal law of Polarity or essential Dualism.'[14]

Coleridge's energy state physics is the key to the "quantum principle of superimposition" (Spisani, p. 9):

> . . . the *superimposing* of one or more states, leading to different results observable at different times (but not to a predeterminable, sole, objective result); hence one must no longer expect any *model* to exist, in the usual sense of the word.
>
> If one or more 'states' are placed one over the other, till they form a new one, the *result* which may now be hypothesized will not be different from the result of one of the original 'states.' Yet it is not possible to know, determinately, which one it corresponds to, at an exact instant *(n)* of the *observer's time (t),* since the *result* will be identical to one of the results of the 'states' superimposed, even supposing for the moment that it may appear at the same time, as *a* and non-*a,* that is as *identical* and as *different,* in the same instant (t_n) of *different observes* [sic]. [Spisani, pp. 9, 11]

As a result, "One concludes that when, in the case of p and q (the one relating to *time,* the other to *space*), the more the value of one of them is defined, the less can the value of the other be determined" (p. 21).[15]

The Rime of the Ancient Mariner, like other voyage poems, involves the reader's sensations of motion: "With the reservation that one finds a whole variety of 'coalescent' experience in *The Ancient Mariner,* one is tempted to say that it is as much *about* motion as, say, Turner's *The Shipwreck* (1804) or his *Calais Pier* (1803); the immediate, all-pervasive 'texture' through which the inner meaning shines forth is primarily expressed in the sense of movement" (Cornwell, p. 227). The quantum-theory comparison which I am proposing may be applied to the poem to explain the elements of velocity and position in it. The reader of the poem is the observer and the mariner's tale and the gloss, respectively, are the different states of velocity and position simultaneously present.[16] The "particle" may be any segment of text taken as a unit by the eyes of the reader; the parameters of "particle" will vary from reader to reader, though most readers will probably perceive the individual groupings of gloss, and text glossed, respectively, as the basic units of measure. The velocity is the speed at which the reader perceives the tale to progress, and the position is narrative distance, varying from the total emotional involvement of the mariner to the at times almost indifferent state of the glosser.

The reader electing to scan the Mariner's tale first, without reference to the gloss, will have an entirely different sensation

of velocity from that experienced by the reader choosing the opposite approach. The reader of the mariner's story by itself will be for the most part carried along by the breathlessly, perhaps even thumpingly, rhythmic ballad. A sluggish narrative conveys the same basic story to the reader of the gloss only. If due allowance is made for the diction, the glosser's version sounds something like a high-school student's book report. Here, for example, in prose form, is the gloss to Part 1 of the seven parts of the poem:

> An ancient Mariner meeteth three Gallants bidden to a wedding feast, and detaineth one. The Wedding-Guest is spellbound by the eye of the old seafaring man, and constrained to hear his tale. The Mariner tells how the ship sailed southward with a good wind and fair weather, till it reached the Line. The Wedding-Guest heareth the bridal music; but the Mariner continueth his tale. The ship driven by a storm toward the south pole. The land of ice, and of fearful sounds where no living thing was yet to be seen. Till a great sea-bird, called the Albatross, came through the snow fog and floating ice. The ancient Mariner inhospitably killeth the pious bird of good omen. [*Poetical Works*, pp. 187–89]

In only two spots thereafter is the somnolent drone of subject-verb-object interrupted, first for the breathtaking "No twilight within the courts of the Sun" (*Poetical Works*, p. 195) and then for the lovely

> In his loneliness and fixedness he yearneth towards the journeying Moon, and the stars that still sojourn, yet still move onward; and every where the blue sky belongs to them, and is their appointed rest, and their native country and their own natural homes, which they enter unannounced, as lords that are certainly expected and yet there is a silent joy at their arrival. [*Poetical Works*, p. 197]

My explanation for the abrupt departure from the agonizing tedium otherwise exhibited in the gloss is twofold: (1) the two departures serve as a "control group," tipping the reader that the turgidity of the rest is an intentional effect rather than inept composition, something that a writer with Coleridge's reputation for obscure prose might well wish to provide; (2) they underscore the microcosm-macrocosm differential. Both of the passages personify the elements, and the resulting celestial giantism further dwarfs the mariners. This consistent miniaturizing of the human figures ("as idle as a painted ship / Upon a painted ocean," lines 117–18, p. 191, *Poetical Works*), while in-

flating the personifications of nature ("At one stride comes the dark," line 200, p. 195, *Poetical Works*), is carried on within the mariner's tale as well as the gloss.

The reader who goes back and forth from gloss to ballad will encounter the start-and-stop situation so familiar to city commuters in heavy traffic. Whether the experience of the gloss or the experience of the mariner's tale actually materializes for a given reader will of course depend upon choice of reading order, just as in physics the state of a particle is only established in the act of observation or measurement of it.[17] Furthermore, the alert reader will discover as he reads the gloss that he is much better informed of the position of the ship and mariner on the voyage than is one starting with the text. In the mariner's tale, the six positional signals[18] are of limited information value, are less specific than those of the gloss, or merely repeat information obtainable earlier from the gloss.[19] Conversely, however, the reader of the mariner's tale is given a time indication at thirteen points in the text,[20] as compared to only two such indicators, neither adding to the data of the tale, for the gloss.[21] In short, just as in quantum measure the more determinable is the position of a particle the less determinable is its time of occurrence, and vice versa, so in *The Rime of the Ancient Mariner* the more determinate is the ship's position, via the gloss, the less determinate is the time of incidence in that position, knowable via the mariner's tale.[22]

This phenomenon manifests itself in the way the reader perceives the genre of the poem, and in the way he sees the symbolism. Fogle (1957) has identified *The Rime of the Ancient Mariner* as ". . . in kind a romantic poem, in the special sense in which Coleridge calls *The Tempest* a romantic poem—a drama of purest imagination, as free as the imagination can make it from the trammels of time and space" (p. 111). Freedom from time and space, I submit, is only an illusion arising from the fact that our ordinary perceptual processes may not immediately pick out the trammels of indeterminacy. The symbolism of the poem seems to be worked out in a similar way. The values of the sun and the moon, for instance, Delson shows to have ". . . alternatingly benevolent and malevolent associations, sometimes in the same scene. . . . If construed, as representing nature, their chief cumulative attribute as they affect the Mariner and his crewmates is of an instability so repetitive as to assume treacherous proportions" (p. 719).

Obviously the comparison which I have been drawing deliberately ignores what would be an essential distinction, were the purpose of the comparison not simply illustrative: in *The Rime of the Ancient Mariner* gloss and tale, position and time, are available to the reader-as-observer simultaneously, whereas in quantum determinations precise measurement of both factors at the same time is impossible, not merely a process which involves two separate measurements fused artificially into one. If we consider, however, the locus of the mariner-as-observer and the glosser-as-observer, the comparison sharpens considerably. Assuming the generally agreed upon identification of the mariner as a figure from the Age of Discovery and the glosser as a seventeenth-century character, and also adopting the admittedly far from tenuous assumption that these two figures are representatives of their times, it is easily enough concluded that neither historical era permits a vantage point perceptually sufficient to establish both space and time positions at once.[23] In addition to his constant desire to fuse the many discrete moments into the oneness of eternity, consistent with his belief in "a possible experience of time itself as organic and not merely linear . . ." (Barfield, p. 255 n.46), Coleridge was able, here, to show them as non-overlapping integers.

It is certain that Coleridge perceived the movements of entities (particles) comprising natural phenomena: "What a sight it is to look down on such a Cataract!—the wheels, that circum-involve it—the leaping up & plunging forward of the infinity of Pearls & Glass Bulbs—the continual *change* of the *Matter,* the perpetual *Sameness* of the Form—. . ." (*Collected Letters,* 3:853). It is equally certain that Coleridge applied to literary works his observations about natural phenomena, as Brooke's analysis of Coleridge's *Biographia Literaria* comments about *Venus and Adonis* makes clear:

> . . . with more than the power of the painter, the poet gives us the liveliest image of succession with the feeling of simultaneousness. . . . the effect of the shooting star . . . is there and not there, and yet the sudden vivid movement in the vast unmoving sky leaves an impression of stillness; and in the *difference* between that and Adonis running apace one grasps the dramatic effect of the lines, the effect of his departure in Venus' mind. Not that Adonis really does move like a shooting star, but that to Venus his movement, under shock, has that effect; he is there, he is not there; and in between her whole sense of life collapses—but there is no 'in

> between', the shock gives the feeling of simultaneousness. . . . [Pp. 65–66]

Brooke's description shows Coleridge's literary criticism fitting modern particle theory and observer entry into the situation under observation.

Coleridge's insistence that a literary work's structure ". . . must have the rhythm of a snake or the oscillation of sound waves, and its final effect is to be spiraling rather than merely encircling . . ." (Gilpin, p. 640) is again suggestive. Wave motion (essential to quantum conceptualization) is readily observable in bodies of water and, in this form, often exhibits a rhythm which finds a traditional parallel in musical compositions and in poems which, like *The Rime of the Ancient Mariner,* have regular metric character.[24]

V

Taken only this far, Coleridge's observation is patently simple; it took no Sage of Highgate to trace such a pattern. And yet within it are contained all the modern scientific implications which I have tried to argue provide a profitable vantage point for seeing *The Rime of the Ancient Mariner.*[25] In our own time, a theoretical superstructure and a critical terminology have been developed, by which we can systematically deal with space, time, and narrative stance, as these are autoreflected in a work of art. Not everyone will accept Lang's account, of course, but he does explain, in a systematic and comprehensible way, the works of art constructed in what he terms the "Performative mode":

> In the Performative mode, the interior space and time of the work are not laid out *for* the activity which takes place; they may only be laid out by it. This contingency which turns on the unit of force, the sense of intimacy established between the latter and the structure which finally emerges, involves the viewer as well. The contingency of interior space and time is shared. Those features and the structure which depends on them emerge only in the act of constitution. There are alternate procedures which that act may follow; it is as if the resulting structure has *chosen* its form, conveying the sense of individuality which such choice ever marks out. Such apparent inconcisiveness does not deny the activity of the unit of force—that unit now represents a process which creates the conditions of its own coming to be, a network of space and time the sanction for which is finally a sanction for the structure itself. [P. 276]

If we see, as Ehrenpreis (pp. 10–11) does, *The Rime of the Ancient Mariner* as the "*chef d'oeuvre* of the whole genre," we expect tight structuring. What we find, paradoxically, is that "The Ballad's narration has been aptly compared to the film technique of montage; the story is advanced by a series of quick flashes, one distinct scene following another. There is no connecting tissue between the scenes, no explanation of events leading up to the crucial situation or following it."

Yet this is only the surface appearance of a set of relationships, disciplined in accordance with Lang's criteria for the Performative mode of discourse. The specific consequences, structurally speaking, of Lang's theory are that:

> a . . . purely analytical style, the objective of 'modern' philosophy, would be for Coleridge unthinkable. Further, the relative importance of philosophical certainty, of 'results' in an absolute sense is diminished, while what we might call the 'dramatic' element in philosophy, the process of search and its written enactment, assumes a larger significance. Much of Coleridge's best writing can be read as a dramatic monologue in prose, a mimetic representation, like Wordsworth's philosophical poetry, of the mind in the act of thinking something through: an attempt at truth, with the speaker uncertain what the exact destination of his argument will be. . . . it should not be thought surprising if his language can only point toward that object, imperfectly and by a series of approximations. . . . Even when Coleridge is at his most abstract, as in the essays 'On the Principles of Genial Criticism' or 'On poesy or Art' or, better still, in the *Treatise on Method,* he writes, I believe, with an acute aesthetic consciousness of what he is doing. . . . [Hunt, p. 834]

Hunt goes on to show the "poetic" rather than strictly logical structure of the *Biographia Literaria, The Friend,* and the *Aids to Reflection* (and, by implication, Coleridge's other prose works as well). He points out the endings of *Biographia Literaria* chapters (and some essays) in foreign languages and in scriptural quotations, as well as the resemblance between the eclectic condition of the *Biographia Literaria* and the similar way in which ancient biographies of the philosophers were written, and the resemblance between Coleridge's marginalia and the scholia tradition, "as if to suggest the moment when philosophy, having reached the limits of logical expression, must give way to a sacred language of some kind" (p. 835). Again, the way in which Coleridge handles symbol is that he, "like Keats of the great Odes," "turns it over in his own mind as he writes, as it were

interrogating it until its symbolic implications are exhausted, without reaching a rational solution" (p. 837). Applying the most suggestive term "paralogical" to this approach, Hunt properly emphasizes that "Coleridge's very philosophical terms imply the process, the aspiration to vision, not the attainment. *Es*emplastic power, co*ad*unating power, even etymologically, are terms of volition and transition, not of finality" (p. 836).

This "paralogical" structuring seems to me a perfectly natural outgrowth of Coleridge's scientific orientation and, in many respects, parallel (even analogous) to it. Coleridge's biological speculations manifest a similar belief in what we might term "logical discontinuity," although Coleridge believes that "all things strive to ascend, and ascend in their striving" (*Aids to Reflection*, p. 181). He also is convinced that there is a "wide chasm between man and the noblest animals of the brute creation, which no perceivable or conceivable difference or organization is sufficient to overbridge . . ." (*Theory of Life* [Shedd, 1:381–82]). Miller explains Coleridge's reconciliation of these two concepts in the belief that nature does not display "continuous progression," but "spurts" or "mutations" (p. 85).

This "paralogical" (or nonsequential) mode of progression is also extended by Coleridge to relationships governed by principles of physics: "The connection between the symbols of time, space and motion and the symbols of length, breadth and depth is not a logical one. Rather it must be seen, as he tells Tulk, as multiplications of the power, such as the square or cube" (Miller, p. 88). In more concrete terms, we can say that "Despite his errors, his struggles to give a philosophical basis to science are not without merit. Like the modern scientist, he feels the need to see matter as energy in a dynamic flux, operating within fixed laws and creating its own predicable patterns of relationships" (Miller, p. 86).

For Coleridge, then, the substance of reality is bound up with mind to such a degree that *natura* is not fully established until perceived. It is also not lifeless matter, the constitution of which has been imposed from outside by mechanical laws of cause and effect.[26] Rather it is, to apply quantum terminology, autoreflected. Form is organically evolved from within, by material and mental processes working in monadic concert. Applied to literary criticism and borne in mind, perhaps, during the composition of the gloss to a great poem, these principles yielded results of the utmost importance. Schlegel has traced

> . . . the ultimate origin of the new physical philosophy in the *Critique of Pure Reason* published in 1787 by Immanuel Kant. For it was Kant [whose work Coleridge of course knew well] who first effectively argued that in knowing nature man significantly contributes to its properties. . . . It is a nice thought, that what the sage of Konigsberg began, came to firm physical fruition some 148 years later, a few hundred kilometers across the Baltic Sea in Copenhagen. [Schlegel, p. 220]

Perhaps intermediated by the Sage of Highgate.

Notes

1. The impressive range of books with interdisciplinary scope can be seen from the titles listed in References, following these Notes. See, e.g., Colmer, Barth, Sanders, Muirhead, Appleyard, William Kennedy, and Badawi. Authors and/or works cited in parentheses, in both text and Notes, receive full citations in References.

2. As in Abrams (1972), Ball, and Barfield. Although the scientific content of Coleridge's prose works has not gone unnoticed, only a few studies in past years have been more than peripherally concerned with it. Besides Sanders, one might single out Snyder (1924 and 1932), Evans, and Miller as representative in, respectively, the decades 1920–1970.

3. So Wells (p. 314) concludes about Coleridge's dealing with Herder and so Sankey (p. 63) concludes about Coleridge and Kant (cf., Chinol, Orsini, and Park). McFarland exonerates Coleridge from accusations of stealing from Schelling, often pointing out that Schelling himself refused to acknowledge the justice of charges that Coleridge had pillaged his works: "It seems to me, indeed, that Coleridge's total intellectual position is remarkably dissimilar to that of Schelling—that their thought is not only not identical, but also not even parallel" (p. xxxvi). On the same basis McFarland claims Coleridge's independence of Jacobi, Steffans, Friedrich von Schlegel, Herder, and Kant. Just three pages earlier, he disposes of the notion that Coleridge might be merely an offshoot of the Cambridge Platonist tradition (p. 24 n.1). Nor were Coleridge's links to English philosophy in general ironclad, as Wilma Kennedy (p. xvii) concedes.

Another contention that has been realized to its full potential for explaining the purpose of Coleridge's borrowings and mitigating their adverse consequences is that his borrowings are a technique of style. McFarland proceeds *in extenso* to explain that, vis-a-vis his *magnum opus,* Coleridge's borrowings constitute a "mosaic" organizational pattern (p. 27), the mere quarrying of stone to inlay the design of his philosophy (p. 195). That the *magnum opus* was never finished does not alter this argument. Hunt (p. 837) offers a reasonable explanation for the apparent facts that ". . . his theories are fragmentary and his borrowings seem ill-malgamated" (p. 485): when philosophical prose approaches the transcendental as subject matter, the prose inevitably starts to "function paralogically." Fruman's case against Coleridge does not seem to me to alter these conclusions.

4. The references are concentrated in the prose works, not only because prose is normally the appropriate medium for transmission of scientific data, but also because as Schulz (1963) observes, ". . . he drifted steadily between 1800 and 1810 from poetry to prose as his principal medium of expression . . ." (p. 141). A convenient compendium of selections from Coleridge's scientific writings in prose is to be found in chapter 7 (pp. 223–60) of *Inquiring Spirit.*

5. To a certain degree, Coleridge may be engaged in nothing more than typically estecean posturing, as he certainly is in his remark to Cottle in April 1797: "I should not think of devoting less than 20 years to an Epic Poem. Ten to collect materials and warm my mind with universal science. . . . So I would spend ten years—the next five to the composition of the poem—and the five last to the correction of it" (*Collected Letters,* I: 320–21). But he was totally in earnest in many other places, as when he solemnized: "I therefore go, and join head, heart, and hand, / Active and firm, to fight the bloodless fight / Of Science, Freedom, and the Truth in Christ" (Lines 60–62 of "Reflections on Having Left a Place of Retirement," p. 108 in the *Poetical Works.* Cf., *Collected Letters,* 2:864 and Zall, p. 67). Even though Coleridge is justly notorious for proposing vast writing projects which he never started, much less completed, and for projecting an inflated image of his own erudition, he *was* impressively erudite (Whalley, 1969, p. 251; Bush, p. 51), he *did* accomplish a great deal, and he *did* practice as well as espouse the idea that the scientist and the creative writer should proceed in similar ways about their common business: to expand the stock of human knowledge about the universe.

In the case of *The Rime of the Ancient Mariner,* the cautionary note sounded by Magnuson that "almost twenty years separate the publication of the poetry and the later prose that is often used to explicate the poetry" and that "the poetry was not written to exemplify the later program" may safely be muted, as Magnuson himself concedes: "he revised the poetry for *Sibylline Leaves* (1817) so that it would more nearly approximate his later theories: the gloss was added to 'The Ancient Mariner' . . ." (p. xiii).

6. This does not represent a critical bolt out of the blue, of course. Hazlitt (in 1818) has much the same conviction: "In Shakespeare there is a continual composition and decomposition of elements, a fermentation of every particle in the whole mass, by its alternate affinity or antipathy to other principles which are brought into contact with it. Till the experiment is tried we do not know the result, the turn which the character will take in new circumstances" (p. 51). Hazlitt's stress on the need for "experiment" enhances the modern sound of this passage.

7. The very term *organic* presupposes a connection to the world of nature, if not precisely to science. McKenzie's explanation of this concept remains one of the best.

8. Here and elsewhere in this essay I am employing the dominant "Copenhagen interpretation" of quantum theory which, however, continues to meet respectable dissent. A précis of the debate over the validity of this view is accessible in two nonmathematical treatments of the subject: Baker and March.

9. ". . . fluent annotation begins in 1801, and the most copious notes were written from 1808 onwards with rather heavy emphasis on the years from 1816 . . ." (Whalley, 1968, p. 430). Magnuson dates *The Rime of the Ancient Mariner* revisions from "late fall 1806 or early 1807. Thus at least by this time he was working on revisions that did not appear until 1817 . . ." (p. 53). It might be added that tinkering with *The Rime of the Ancient Mariner* continued well into the period when Coleridge was evolving his serious scientific notions. The beautiful "No twilight within the courts of the Sun" (gloss to lines 199–200; *Poetical Works,* p. 195), for instance, was composed as "an afterthought to the 1817 gloss to 'The Ancient Mariner' which was not printed with the gloss until 1828) . . ." (Johnson, p. 452).

Even the tone of the marginal notes of this period coincides with the feeling we get from the gloss to *The Rime of the Ancient Mariner:* "The habit of extensive annotation as a mode of self-communing, of breaking solitude by direct communication with the author of a book, begins in the Malta period 1804–06 . . ." (Whalley, 1961, p. 289).

10. It is only fair to add, however, that I did too. In an article (1977) accepted before Dyck's article appeared, I too was more inclined to see the narration of the poem in

terms of perspective (stance) than structural function. In another article (1973, p. 27), I likened the narrative to those in, respectively, *The Sound and the Fury* and *Pale Fire*. I now think that my comparisons have the same limitations that Dyck's comparison does.

11. In some ways, this comparison is closer than either of the other two. The specific tale of the Joads versus the generalized commentary of the interchapters has its counterpart in the bizarre tale of the mariner as opposed to the perfectly standard, even pedantically traditional, scholarly rendition of the glosser; the swift pace of the Joads' story in contrast with the more controlled tempo of the intercalary chapters fits a similar disjunction between the speed of the narrator's story and the torpor of the glosser's version; and the intercalary chapters' coverage of the same ground as the experiences of the Joads corresponds to the mariner-glosser situation in *The Rime of the Ancient Mariner*. Neither *The Moonstone* nor *The Ring and the Book* (or, for that matter, *The Sound and the Fury* or *Pale Fire*) has these features in common with *The Rime of the Ancient Mariner*.

12. Kurtz interprets this sign to mean "opposite" or "antithesis."

13. It may seem less startling to credit Coleridge with such a modern insight if we recall that comparisons between Coleridge's views and more recent science are a familiar part of Coleridge criticism; e.g., "If everything is the 'copula' of 'opposite energies,' then energy must be the sole basis of all existence and reality. For us, the concept of the atom may best illustrate what Coleridge means. Although entirely energy ($e = mc^2$), the atom presumably exists only when the free electron energy balances the 'passive' proton energy. . . . the prothesis of the atom—Coleridge would say today—is not the atom itself, but the force which gave birth to the two energies, negative and positive" (Miller, p. 81).

14. Abrams, pp. 27–49, based on utterances such as the following (from Egerton MS 2801 f. 151, quoted by Barfield, p. 204 n.28):

> It follows, therefore, that Body cannot be essentially *material*—but that Depth—e.g., a Power, manifesting itself in space, and contemplated in its *phenomena*, Length and Breadth, is what we mean by Body. The term, matter, therefore, taken separately, should be confined to the Phaenomena—i.e. to Length and Breadth without Depth—now as in bodies the only universal Evidence of Depth is Weight, therefore matter but not body should be attributed to imponderable Phaenomena—Light, Heat, Magnetism, Electricity are material but not corporeal.

15. A conclusion, however, which does not banish determinacy altogether:

> Yet when the classical representations are transformed by the postulates of quantum mechanics to obtain the probability amplitude, a means is provided for predicting the *probability* that a particular picture will be revealed, as the result of an observation. . . . Thus the quantum mechanical world provides an *exact* prediction of the *probability* of future events, despite the uncertainty of the events themselves. [Baker, pp. 222, 225]

16. To be perfectly precise, it would also be necessary to factor the contributions of the ballad narrator, the Wedding Guest, the First and Second Voices, the Hermit, the Pilot, and the Pilot's Boy, all of whose voices are heard at one time or another in the poem. Doing so, however, does not alter any of my conclusions; so, in the interest of clarity, I have omitted this interpretational refinement.

17. The givens of time and space in the poem are, of course, susceptible of other explanations; e.g., the influence of laudanum consumption on the poet (Abrams, 1934, pp. 27–29; Lefebvre, p. 441; Marks, passim). Fortunately, we are not enjoined to accept only one of the theories about the handling of time and space in *The Rime of the Ancient*

Mariner. After pointing out that in science two (incongruent) propositions cannot be retained to explain the same set of facts, Miner notes that "The opposite is true of literature. No pastoral elegy among those on the death of Sir Philip Sidney falsifies any of the others, no Impressionist still life an earlier one, no Viennese Waltz another Waltz" (p. 493). While it is obvious that an assertion about a work (especially about the causes of its unique structure) is not the same kind of "proposition" as that embodying the work itself, Miner goes on to add a condition equally valid for both sets of statements: "Aesthetic knowledge is virtually, not predictively, true. It therefore endures as not being falsifiable." Miner builds upon Meyer's distinction between "presentational" and "propositional" knowledge, illustrated in this way: "Thus, although only one true hypothesis accounts for the way that the refraction of light on water droplets produces the colors of a sunset, there are innumerable specific sunsets, each of which can be enjoyed for its own special effect" (p. 170). Meyer goes on to suggest the kind of "originality" offered by the "presentational manner": "The artist . . . is concerned not with the discovery of general principles but with their use. He employs the rules and regularities of a prevalent paradigm—the grammar, syntax, and formal procedures of an existing style—in order to create an original pattern of particulars: a work of art" (p. 173).

18. These are lines 22–24, p. 187 ("Merrily did we drop / Below the kirk, below the hill, / Below the lighthouse top"); lines 25–28, p. 197 ("The Sun came up upon the left, / Out of the sea came he! / And he shone bright, and on the right, / Went down into the sea:"); line 50, p. 188 ("And southward aye we led"); lines 83–86, p. 189 ("The Sun now rose upon the right: / Out of the sea came he, / Still hid in mist, and on the left / Went down into the sea"); lines 404–7, p. 204 ("Oh! dream of joy! is this indeed / The lighthouse top I see? / Is this the hill? Is this the kirk? / Is this mine own countree?"); and lines 570–71, p. 207 ("And now, all in my own countree, / I stood on the firm land!").

19. Schulz (1963, p. 70) mentions several unquestionably important pieces of information conveyed by the gloss: "We first learn from the gloss that the seamen 'make themselves accomplices in the crime' of the mariner when they justify his murder of the albatross, and that 'Death and Life-in-Death have diced for the ship's crew and she (the latter) winneth the ancient mariner." I cannot agree with him, however, that "Many such ambiguous parts of the narrative were eventually clarified by the gloss." My reaction to the information value of the gloss coincides with that of Watson (pp. 92–93) that the gloss is more confusing than helpful and adds very little data not ascertainable elsewhere by the reader.

The gloss has "The Mariner tells how the ship sailed southward with a good wind and fair weather, till it reached the line" (p. 187); "The ship driven by a storm toward the south pole" (p. 188); ". . . the ship . . . returned northward through fog and floating ice" (p. 189); ". . . the ship enters the Pacific Ocean, and sails northward, even till it reaches the Line" (p. 190); "The lonesome Spirit from the southpole carries on the ship as far as the Line . . ." (p. 201); ". . . the angelic power causeth the vessel to drive northward . . ." (p. 203); "And the ancient Mariner beholdeth his native Country" (p. 204).

20. Excluding such indefinite notations as "Day after day" or "all the night," we find: " 'Higher and higher every day, / Till over the mast at noon—' " (lines 29–30, p. 188); "The glorious Sun uprist" (line 98, p. 190); "The bloody Sun, at noon, / Right above the mast did stand" (lines 112–13, p. 190); "The death-fires danced at night" (line 128, p. 191—because of the next reference, "There passed a weary time," line 143, p. 192, I take "at night" to mean "during one night," rather than the generic "at nighttime"—and "weary time" perhaps is also a questionable inclusion, since it is hardly more specific

than "Day after day"); "The western wave was all a-flame, / The day was well nigh done! / Almost upon the western wave / Rested the broad bright Sun" (lines 171–74, p. 193); "The Sun's rim dips; the stars rush out; / At one stride comes the dark" (lines 199–200, p. 195); "Seven days, seven nights, I saw that curse" (line 261, p. 197); "The moving Moon went up the sky, / And no where did abide; / Softly she was going up. / And a star or two beside—" (lines 263–66, p. 197); "For when it dawned—they dropped their arms" (line 350, p. 200); "Till noon we quietly sailed on" (line 373, p. 201; and "The Sun, right above the mast, / Had fixed her to the ocean" (lines 383–84, p. 201).

21. "At the rising of the Moon" (p. 195) and "By the light of the Moon he beholdeth God's creatures of the great calm" (p. 198). Read consecutively in this note and the one preceding, the time references are even more obviously vague and/or ritualistic than is apparent when they are encountered in their normal sequence in the poem. Whether they can with assurance be called time markers, as opposed to pattern points, may itself be disputable. This, however, enhances rather than distracts from the effectiveness of these signals according to the theory which I am advancing, since another of the offshoots of the quantum measures is "to make one foresee an 'area' in mathematical space in which objective time (T_n) does not play an operative role" (Spisani, p. 111). The way in which the time references work is generally recognized in a novella recent enough to have been influenced by the milieu of quantum measurement, and a work otherwise very similar to *The Rime of the Ancient Mariner,* Ernest Hemingway's *The Old Man and the Sea:* "The some two hundred references to Santiago as 'the old man' have the cumulative effect of suggesting that he is preternaturally old. . . . His scars are 'as old as erosions in a fishless desert' (p. 10). Just how old are such erosions. . . . The fish also appears suspended in time and space. . . . In this manner, by various direct statements and by 'poetic' similes and images, Hemingway has made the visible a little hard to see" (Baskett, pp. 273–74). Cf., Montgomery, for a thesis about the impact of Werner Heisenberg's Principle of Uncertainty on Eliot.

22. A condition visible in different terms if one focuses on the diagrams sometimes drawn up to chart the Mariner's voyage geographically. Spisani's remarks (pp. 143–51) about endomorphic self-reflection versus exomorphic diagrammatic representation can be applied to the way in which, as reader-observers, we should view such schematic abstractions.

23. Though this remains the problem of the observer and in no way argues against the belief in their ultimate oneness. Quite the contrary: "For a Thing at the moment is but a Thing of the moment / it must be taken up into the mind, diffuse itself thro' the whole multitude of Shapes & Thoughts, not one of which it leaves untinged—" (*Notebooks,* p. 1597).

24. Coleridge consciously incorporated metrical duration into structural patterns in verse:

> The notebooks provide evidence from the voyage to Malta that Coleridge himself had an accurate sense of metrical duration that corresponds to the tonal discrimination that musicians call perfect pitch—a sense of the absolute duration of a given metrical unit (a line, say, of a certain pattern) providing a temporal matrix within which the words, finding their own unique rhetorical and dramatic values, declare in the fullest sense their meaning. [Whalley, 1969, pp. 271–72]

25. Obviously, it is also necessary to keep constantly in mind the limitations, as well as what I trust are the advantages, of the model, lest we inadvertently convert Coleridge into a nineteenth-century Bohr. For, at several specific points Coleridge rejects precisely the arguments needed to sustain a consistent field or quantum viewpoint; e.g.,

> Opposites . . . are of two kinds, either logical, that is, such as are absolutely incompatible; or real, without being contradictory. A body in motion is something—Aliquid cogitabile; but a body, at one and the same time in motion, is nothing, or at most, air articulated into nonsense. [*Biographia Literaria,* 1:197]
>
> . . . it is impossible that 'a succession of different states should be the effect of the same agents in the same proportions of agency.' [Unclassified MS at Victoria College, Toronto; quoted by Barfield, p. 205 n.2]

Earlier, Barfield points to another major departure of modern science from the inclination of Coleridge:

> To investigate scientifically the nature of Nature is to investigate the nature of phenomena as such. It is to ask the question: What is a phenomenon: True, 'Everything comes from other things and gives rise to other things.' Of any particular phenomenon we can say, tracing the chain of cause and effect: 'this comes from such and such another phenomenon or group of phenomena.' But if it is really the origin of phenomena *as such* that we are seeking to investigate, this answer will no longer serve: 'the solution of phenomena can never be derived from phenomena.' [P. 23; Coleridge citations are from *The Friend,* 1:500]

But we should not allow Coleridge's missteps to diminish the impressiveness of what he did foresee. Proper perspective emerges from some contemporary instances which indicate the difficulty of accurate scientific foresight. In a synopsis of the predictive value of science fiction from antiquity to the present, Asimov singles out two Heinlein stories for their remarkable anticipation of subsequent occurrences. The first, "Solution Unsatisfactory," appeared in the May 1941 issue of *Astounding Science Fiction.* Of it Asimov says:

> The story was written before Pearl Harbor, but Heinlein did not predict the American involvement in World War II. He *did* predict, however, the establishment of the Manhattan Project, and the development of a nuclear weapon. He was wrong in his details, but right in essence. Even more amazing, he went on to predict the nuclear stalemate that would exist after World War II, and got that quite correct. [Pp. 290–91]

Asimov lauds "Blowups Happen," from the September 1940 number of *Astounding Science Fiction,* for the same reason: This story contains an "astonishingly vivid description of a nuclear power plant and harrowing efforts to prevent it from destroying the environment. If these extrapolations are, respectively, "amazing" and "astonishingly vivid," coming as they do only a few months or a very few years in advance of the technology which realized them, and, nonetheless, are "wrong in details, but right in essence," how much greater does that make Coleridge's vision?

26. A. point put clearly in the *Theory of Life:*

> . . . the bareness of the mechanic system . . . which . . . demanding for every mode and act of exiδtence real or possible visibility, it knows only of distance and nearness, composition (or rather compaction) and decomposition, in short, the relations of unproductive particles to each other; so that in every instance the result is the exact sum of the component qualities, as in arithmetical addition. This is the philosophy of Death. . . .

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